Units of Microstrain Quarter, Half, and Full Configurations Wiring the P3500 Operating the P3500 Modern Solution

Module 4 - Strain Gauges

ME3023 - Measurements in Mechanical Systems

Mechanical Engineering
Tennessee Technological University

Topic 3 - P3500 Strain Indicator

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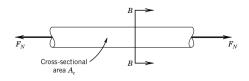
- Units of Microstrain
- Quarter, Half, and Full Configurations
- Wiring the P3500
- Operating the P3500
- Modern Solution

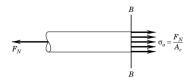


Units of Microstrain

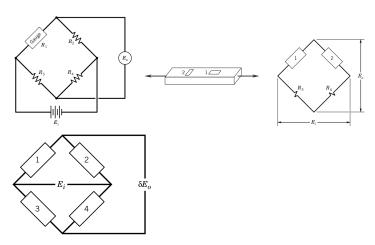
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Units of Microstrain





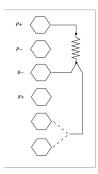
Quarter, Half, and Full Configurations

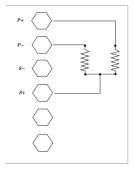


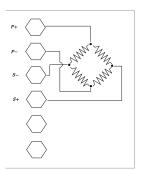
Quarter, Half, and Full Configurations

| | Arrangement | Compensation Provided | Bridge Constant κ |
|-----------|---|--------------------------|----------------------|
| | Single gauge in uniaxial stress | None | к = 1 |
| | Two gauges sensing equal and opposite strain—typical bending arrangement | Temperature | κ = 2 |
| <u>↓</u> | Two gauges in uniaxial stress | Bending only | κ = 2 |
| 1 2 3 | Four gauges with pairs sensing equal and opposite strains | Temperature and bending | к=4 |
| 1 2 | One axial gauge and one Poisson gauge | | κ= 1 +ν |
| Shaft — E | Four gauges with pairs sensing equal and opposite strains—sensitive to torsion only; typical shaft arrangement. | Temperature and axial | κ = 4 |

Wiring the P3500







Operating the P3500

- The instructions are on the unit.
- The balancing process is completed after changing any wiring.



Modern Solution

- The P3500 is old technology, but still does not mean it is bad.
 I have used them myself and they work great.
- The manufacturer *Vishay Group* has a *more* modern solution with DAQ and multiple channels.
- There are a variety of low cost options available but be careful.
 - Sparkfun strain gauge basics
 - Robot Shop
 - elecrow